ABOUT VOLTAGE

A few words about voltage may help you understand the operation of your transformer so that you can use it to the best advantage. The "fixed" voltages marked on your transformer panel or the voltages indicated by your transformer voltage control at any particular setting are almost never the actual voltages delivered to your track or your accessories. The reasons for this variation are several. The voltages marked on your transformers are "nominal". That is, they are accurate only under certain specified conditions: when the line voltage fed into your transformer is just 115 volts and when *no current is drawn* from the transformer. Actually, the line voltages may vary from 125 to 110 volts, or even lower, depending on the standards in your locality and on how much electricity is being used at a particular time. This variation, naturally, results in a comparable variation in the output voltage of the transformer. If your train seems to run slower during a sudden storm it's probably because hundreds of people in your neighborhood had switched on their lights and so depressed the line voltage.

In the same way that a heavy demand for power may lower the voltage in your neighborhood, a heavy load on your transformer lowers *its* output voltage as well. For example, the fixed binding posts which are marked 14 volts may, under actual operating conditions deliver only 12 volts, or even less. In the case of a short circuit so much current is drawn from the transformer that its voltage drops to 2 or 3 volts—too low to operate the train or even light the lamps.

In addition to the voltage loss in the transformer itself, commonly called the "regulation" of the transformer, still further voltage losses occur in connecting wires. For this reason wiring of a large layout should be carefully planned. If a platform is used, the wiring is best located on the under surface of the platform. All wires should be as short as possible. To keep your wiring to a minimum, accessories which require the same voltage, should be ganged up in "parallel," as shown in Figure 47. This "feeder" system can be used for wiring operating accessories as well.

USING AUXILIARY LOCKONS

In operating large layouts it is frequently found that the train slows down when running on the portion of track farthest from the Lockon. This is due to voltage losses in the track itself and can be remedied by attaching additional Lockons at the points on the track where the train slows down. See Figure 61. Be careful to connect the No. 1 and No. 2 clips of the auxiliary Lockons to similarly numbered clips of the Lockon connected to the transformer or else a short circuit will result. Ordinary lamp cord is well suited to these connections as well as for "feeders" described above.

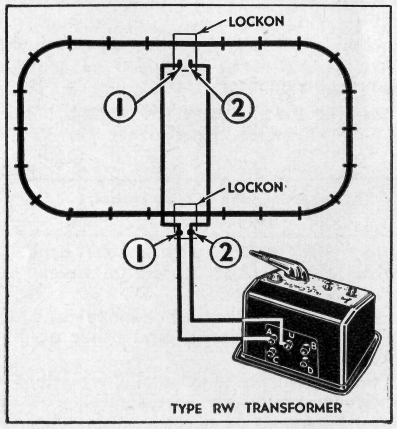

Figure 61—Using Voltage Lockons to Offset Voltage Losses

The main part of voltage losses in the track is due to loose track pins. These loose connections can be frequently detected by the heating effect of poor electrical contacts. After the layout has been in operation for a half hour or so, run your finger down the rails. Loose rail joints will then become apparent as hot spots on the track.

PART THREE

HOW TO BUILD A MODEL RAILROAD

One of the most fascinating things about owning a miniature train is the planning and building of a model layout that has all the features of an actual railroad system. With Lionel's wide selection of tracks and accessories—and now, "Magne-Traction" — it is easy to duplicate any of the operations of the big roads. Like all hobbies, model railroading develops slowly. You can start with a layout that fits your income, and add to it year by year.

PLAN FOR THE FUTURE

First step is to get out your pencil and put down a few ideas that will guide you in your planning. How much space is available for your complete layout? It is better to overestimate your space requirements than to find yourself later in cramped quarters, that will necessitate ripping up track and starting over. Next, how much rolling stock do you have, and how much more do you plan having?

When you plan your first track layout, be sure to allow for future growth of your rail system. As you add to your rolling stock you will want more sidings, classification yards, wyes, reverse loops. The siding in today's layout may tomorrow become a complete new branch of your railroad empire.

At the right you will see a few of the simpler types of starting layouts. These are "O" track. "027" layouts will be slightly smaller.

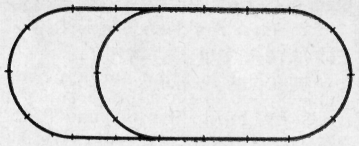

Figure 1.—Overall dimensions: 82" x 32". Track requirements: 8 sections straight, 10 sections curved, pair of switches.

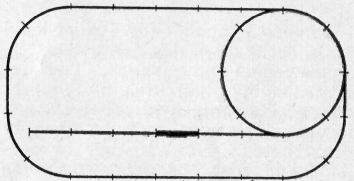

Figure 2.—Overall dimensions: 82" x 41". Track requirements: 14 sections straight, 9 curved, 3 switches, 1 remote control section.

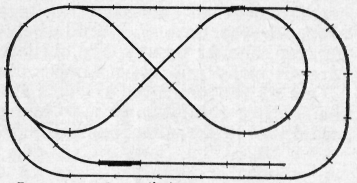

Figure 3.—Overall dimensions: 82" x 41". Track requirements: 15 sections straight, 14 sections curved, 5 switches, one 90° crossover, one remote control section.

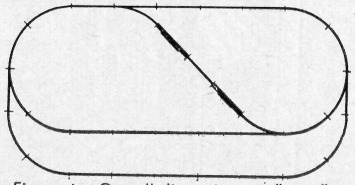

Figure 4.—Overall dimensions: 82" x 41". Track requirements: 14 sections straight, 10 sections curved, 4 switches, 2 remote control sections.